BRUHAT BANGALORE MAHANAGARA PALIKE
BYATARAYANAPURA DIVISION

**Name of Work:** Package No.02 (Package consists of 14 works).

**Name of the Agency:** M/S. Benaka Developers & Project Pvt. Ltd.

FIFTH AND FINAL BILL

TEST REPORTS


TEJUS CONSULTANTS
CONSULTING ENGINEERS AND DESIGNERS
No.58 MIG, 6th Cross, 3rd Main
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TEJUS
CONSULTANTS

No. TC / BBMP / RI / BYT-PMC / 620 / 21-22

Date: 31 – 01 – 2022

To
The Executive Engineer,
Bruhat Bangalore Mahanagara Palike,
Byatarayanapura Division,
No. 2152/20, Defence Colony,
Sahakara Nagar, Bangalore – 92

Dear Sir

Sub: **Fifth and Final bill for the work of Package No.02 (Package consists of 14 works).**

In reference to the above subject, this is to bring to your kind notice that we have scrutinized the **Fifth and Final bill** submitted by **Sri. D. Narahari (Benaka Developers & Project Pvt. Ltd.,)** #34, 2nd Floor, 2nd Cross, Sampige Road, Malleswaram Bangalore-03, towards the above said work and arrived at an amount of **Rs. 2,66,64,295.49/-( Rupees Two Crore Sixty Six Lakh Sixty Four Thousand Two Hundred Ninety Five and Paise Forty Nine Only)** The work has been completed satisfactorily

This is for your kind information.

Thank you and assuring you the best of our Services at all the times

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For Tejus Consultants
(Nischal M)

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## TEST REPORT

| | |
|---|---|
| **Clients** | Bruhath Bangalore Mahanagara Palike |
| **Project** | Package No.02 (Package consists of 14 works) |
| **Consultants** | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. |
| **Total Weight in gm:** | 3000 |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| **Type of Material** | 40 mm down size | **Proposed Use** | PCC |
| **Sample Location** | Kempapura Main Road | **Date of Sampling** | 22-07-2021 |
| | | **Date of Testing** | 23-07-2021 |

| IS Sieve Size | Weight Retained in gm | Cum. Weight Retained in gm | Cumulative Weight Retained in % | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size |
|---|---|---|---|---|---|
| 80.00mm | 0 | 0 | 0.00 | 100.00 | 100 |
| 63.00mm | 0 | 0 | 0.00 | 100.00 | - |
| 40.00mm | 82 | 82 | 2.73 | 97.27 | 95-100 |
| 20.00mm | 1394 | 1476 | 49.20 | 50.80 | 30-70 |
| 10.00mm | 987 | 2463 | 82.10 | 17.90 | 10-35 |
| 4.75mm | 430 | 2893 | 96.43 | 3.57 | 0-5 |
| Pan | 107 | 3000 | 100.00 | 0.00 | |

**Remarks :** ✓ Satisfactory / Not Satisfactory

Note:
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4.The material used in the site satisfied the standard of MORTH's 5th revision and hence can be used in the work.

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| TEST REPORT | |
|---|---|
| Clients | BRUHAT BENGALORE MAHANAGARA PALIKE |
| Project | Package No.02 (Package consists of 14 works) |
| Consultants | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | Benaka Developers & Project Pvt.Ltd. |

# SPECIFIC GRAVITY AND WATER ABSORPTION

## FINE AGGREGATE (IS-2386-PART-3)

| | | | |
|---|---|---|---|
| Type of Material | M sand | Proposed Use | PCC |
| Location/Source | Kempapura Main Road | Date of Sampling | 22-07-2021 |
| Period of Soaking | 24 hours | Date of Testing | 23-07-2021 |

| Sl. No. | Test Property | TRIAL - 1 | TRIAL - 2 | TRIAL - 3 | |
|---|---|---|---|---|---|
| A | Weight of sturated surface dry sample gm. | 662 | 644 | 653 | |
| B | Weight of oven - dry sample gm. | 654 | 636 | 644 | |
| C | Weight of Pycnometer Filled with water gm | 1275 | 1275 | 1275 | |
| D | Weight of Pycnometer + sample + water gm | 1691 | 1679 | 1685 | |
| E | Bulk specific gravity $\frac{B}{(C+A-D)}$ | 2.659 | 2.650 | 2.650 | 2.653 |
| G | Absorption (%) $\frac{(A-B)*100}{B}$ | 1.223 | 1.258 | 1.398 | 1.293 |

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## Test Report on Cement

| | |
|---|---|
| **Project** | Package No.02 (Package consists of 14 works) |
| **Client** | Bruhat Bangalore Mahanagar Palike |
| **Consultant** | TEJUS CONSULTANTS |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. |
| **Sample ID** | Cement (ACC Cement) OPC 43 Grade |
| **Date of Sample Tested** | 23-07-2021 |
| **Sample Supplied By** | Agency |

| Sl.No. | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 12269-1987 |
|---|---|---|---|---|
| 1 | a) Initial Setting Time | IS-4031 (Part-5) | 105 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part-5) | 455 Minutes | Not More than 600 Minutes |
| 2 | Soundness | IS-4031 (Part-3) By the Le-Chatelier method | 6 mm | Not More than 10 mm |
| 3 | Standard Consistency | IS-4031 (Part-4) | 29.00% | 25 % to 35 |

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| TEST REPORT | |
|---|---|
| Clients | Bruhat Bangalore Mahanagara Palike |
| Project | Package No.02 (Package consists of 14 works) |
| Consultants | Tejus Consultants, Bangalore |
| Contractor | Benaka Developers & Project Pvt.Ltd. |

**SIEVE ANALYSIS**

| | | | |
|---|---|---|---|
| Total Weight: | 3000 gms | | |
| Type of Material | M sand | Proposed Use | PCC |
| Sample Location | Kempapura Main Road | Date of Sampling | 23-07-2021 |
| | | Date of Testing | 23-07-2021 |

| IS Sieve Size | Weight Retained | Cum. Weight Retained | Cum. % Retained | Cum. % Passing | Spec. Limit (%) Passing (Zone-II) |
|---|---|---|---|---|---|
| 10.00 mm | 0 | 0 | 0 | 100.00 | 100 |
| 4.75 mm | 218 | 218 | 7.27 | 92.73 | 90 - 100 |
| 2.36 mm | 315 | 533 | 17.77 | 82.23 | 75 - 100 |
| 1.18 mm | 426 | 959 | 31.97 | 68.03 | 55 - 90 |
| 0.600 mm | 472 | 1431 | 47.70 | 52.30 | 35 -59 |
| 0.300 mm | 766 | 2197 | 73.23 | 26.77 | 8-30 |
| 0.150 mm | 651 | 2848 | 94.93 | 5.07 | 0 - 10 |
| Pan | 152 | 3000 | | | - |
| | | | | | |

**Remarks :** ✓ Satisfactory / Not Satisfactory

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## TEST REPORT

| | |
|---|---|
| **Clients** | Bruhath Bangalore Mahanagara Palike |
| **Project** | Package No.02 (Package consists of 14 works) |
| **Consultants** | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. |
| **Total Weight in gm:** | 3000 |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| **Type of Material** | 40 mm down size | **Proposed Use** | PCC |
| **Sample Location** | Kempapura Main Road | **Date of Sampling** | 16-08-2021 |
| | | **Date of Testing** | 17-08-2021 |

| IS Sieve Size | Weight Retained in gm | Cum. Weight Retained in gm | Cumulative Weight Retained in % | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size |
|---|---|---|---|---|---|
| 80.00mm | 0 | 0 | 0.00 | 100.00 | 100 |
| 63.00mm | 0 | 0 | 0.00 | 100.00 | - |
| 40.00mm | 82 | 82 | 2.73 | 97.27 | 95-100 |
| 20.00mm | 1388 | 1470 | 49.00 | 51.00 | 30-70 |
| 10.00mm | 966 | 2436 | 81.20 | 18.80 | 10-35 |
| 4.75mm | 439 | 2875 | 95.83 | 4.17 | 0-5 |
| Pan | 125 | 3000 | 100.00 | 0.00 | |

**Remarks :** Satisfactory / Not Satisfactory

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## TEST REPORT

| | |
|---|---|
| **Clients** | Bruhath Bangalore Mahanagara Palike |
| **Project** | Package No.02 (Package consists of 14 works) |
| **Consultants** | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. |
| **Total Weight in gm:** | 3000 |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| **Type of Material** | 40 mm down size | **Proposed Use** | PCC |
| **Sample Location** | Kempapura Main Road | **Date of Sampling** | 16-08-2021 |
| | | **Date of Testing** | 17-08-2021 |

| IS Sieve Size | Weight Retained in gm | Cum. Weight Retained in gm | Cumulative Weight Retained in % | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size |
|---|---|---|---|---|---|
| 80.00mm | 0 | 0 | 0.00 | 100.00 | 100 |
| 63.00mm | 0 | 0 | 0.00 | 100.00 | - |
| 40.00mm | 82 | 82 | 2.73 | 97.27 | 95-100 |
| 20.00mm | 1388 | 1470 | 49.00 | 51.00 | 30-70 |
| 10.00mm | 966 | 2436 | 81.20 | 18.80 | 10-35 |
| 4.75mm | 439 | 2875 | 95.83 | 4.17 | 0-5 |
| Pan | 125 | 3000 | 100.00 | 0.00 | |

**Remarks :** ✓ Satisfactory / Not Satisfactory

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| TEST REPORT | |
|---|---|
| Clients | BRUHAT BENGALORE MAHANAGARA PALIKE |
| Project | Package No.02 (Package consists of 14 works) |
| Consultants | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | Benaka Developers & Project Pvt.Ltd. |

## SPECIFIC GRAVITY AND WATER ABSORPTION

### FINE AGGREGATE (IS-2386-PART-3)

| | | | |
|---|---|---|---|
| Type of Material | M sand | Proposed Use | PCC |
| Location/Source | Kempapura Main Road | Date of Sampling | 16-08-2021 |
| Period of Soaking | 24 hours | Date of Testing | 17-08-2021 |

| Sl. No. | Test Property | TRIAL - 1 | TRIAL - 2 | TRIAL - 3 | |
|---|---|---|---|---|---|
| A | Weight of sturated surface dry sample gm. | 643 | 658 | 633 | |
| B | Weight of oven - dry sample gm. | 635 | 650 | 624 | |
| C | Weight of Pycnometer Filled with water gm | 1275 | 1275 | 1275 | |
| D | Weight of Pycnometer + sample + water gm | 1679 | 1688 | 1673 | |
| E | Bulk specific gravity $\frac{B}{(C+A-D)}$ | 2.657 | 2.653 | 2.655 | 2.655 |
| G | Absorption (%) $\frac{(A-B)*100}{B}$ | 1.260 | 1.231 | 1.442 | 1.311 |

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## Test Report on Cement

| | |
|---|---|
| **Project** | Package No.02 (Package consists of 14 works) |
| **Client** | Bruhat Bangalore Mahanagar Palike |
| **Consultant** | TEJUS CONSULTANTS |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. |
| **Sample ID** | Cement (ACC Cement) OPC 43 Grade |
| **Date of Sample Tested** | 17-08-2021 |
| **Sample Supplied By** | Agency |

| Sl.No. | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 12269-1987 |
|---|---|---|---|---|
| 1 | a) Initial Setting Time | IS-4031 (Part-5) | 97 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part-5) | 492 Minutes | Not More than 600 Minutes |
| 2 | Soundness | IS-4031 (Part-3) By the Le-Chatelier method | 5 mm | Not More than 10 mm |
| 3 | Standard Consistency | IS-4031 (Part-4) | 28.00% | 25 % to 35 |

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## GRADATION FOR GSB
## (As per MORT&H 400-1,Grading-II)

| | | |
|---|---|---|
| **Name of Work** | : | Package No.02 (Package consists of 14 works) |
| **Client** | : | BRUHAT BANGALORE MAHANAGARA PALIKE |
| **Consultant** | : | M/s Tejus Consultants, Bangalore |
| **Contractor** | : | M/s Benaka Developers & Project Pvt.Ltd. |
| **Date of Testing** | : | 10-12-2021 |
| **Type of Mix** | : | GSB |
| **Sample I/D** | : | GSB1 |

| | | | | |
|---|---|---|---|---|
| **Sample Location:** | Kempapura Main Road | **Date of Sampling:** | 09-12-2021 | |
| | | **Date of testing:** | 10-12-2021 | |
| **Type of material & Purpose:** | GSB | **Oven Dry Wt.(gms):** | 10000.0 | |

| IS Sieve size in mm | Weight retained | Cummulative weight retained (gm) | Cummulative % of retained | Cummulative % of passing | Specification limits |
|---|---|---|---|---|---|
| 75 | 0 | 0 | 0.00 | 100.00 | - |
| 53 | 0 | 0 | 0.00 | 100.00 | 100.00 |
| 26.5 | 2131 | 2131 | 21.31 | 78.69 | 70-100 |
| 9.5 | 2520 | 4651 | 46.51 | 53.49 | 50-80 |
| 4.75 | 855 | 5506 | 55.06 | 44.94 | 40-65 |
| 2.36 | 1250 | 6756 | 67.56 | 32.44 | 30-50 |
| 0.425 | 1985 | 8741 | 87.41 | 12.59 | 10-15 |
| 0.075 | 850 | 9591 | 95.91 | 4.09 | <5 |
| Pan | 409.0 | | | | |
| Total | 10000.0 | | | | |

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# AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

| | | | |
|---|---|---|---|
| **Project** | Package No.02 (Package consists of 14 works) | | |
| **Client** | Bruhat Bengaluru Mahanagara Palike | | |
| **Consultant** | TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore | | |
| **Contractor** | M/s. Benaka Developers & Project Pvt.Ltd. | | |
| **Proposed Use** | WMM | **Date of Sampling** | 27-12-2021 |
| **Sample Locati** | Kempapura Main Road | **Date of Testing** | 28-12-2021 |

| Sl. No. | Description | | Test No. 1 | Test No. 2 | Test No. 3 | Spec Limit (%) |
|---|---|---|---|---|---|---|
| 1 | Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm) | (Wa) | 363.00 | 352.00 | 344.00 | |
| 2 | Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm) | (Wb) | 271.00 | 262.00 | 258.00 | |
| 3 | Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm) | (Wc) | 92.00 | 90.00 | 86.00 | |
| 4 | Aggregate Impact Value (%) | (Wc/Wa)*100 | 25.34 | 25.57 | 25.00 | |
| 5 | Average Aggregate impact value | (%) | 25.30 | | | Max - 30 % |

**Remarks :** ✓ Satisfactory / Not Satisfactory

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## FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

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| | |
|---|---|
| **Project** | Package No.02 (Package consists of 14 works) |
| **Client** | Bruhat Bengaluru Mahanagara Palike |
| **Consultant** | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. |

| | | | |
|---|---|---|---|
| **Type of Material** | WMM | **Proposed Use** | WMM |
| **Sample Location** | Kempapura Mn Rd | **Date of Sampling** | 27-12-2021 |
| | | **Date of Testing** | 28-12-2021 |

| **Size of aggregate** | | **Flakiness Index** | | **Elongation Index** | |
|---|---|---|---|---|---|
| **Passing through IS sieve, mm** | **Retained on IS sieve, mm** | **Total wt. of aggregate retained on sieves (A) gms.** | **Wt. of aggregate passing from Flakiness gauge (B) gms** | **Wt. of aggregate retained on Flakiness gauge (C) gms** | **Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms** |
| 63.0 | 50.0 | 0 | 0 | 0 | 0 |
| 50.0 | 40.0 | 0 | 0 | 0 | 0 |
| 40.0 | 31.5 | 0 | 0 | 0 | 0 |
| 31.5 | 25.0 | 0 | 0 | 0 | 0 |
| 25.0 | 20.0 | 0 | 0 | 0 | 0 |
| 20.0 | 16.0 | 658 | 86 | 522 | 82 |
| 16.0 | 12.5 | 1145 | 113 | 1008 | 115 |
| 12.5 | 10.0 | 750 | 64 | 722 | 59 |
| 10.0 | 6.3 | 622 | 62 | 560 | 40 |
| **Total** | | **3175** | **325** | **2812** | **296** |

**Note:** Minimum 200 Pcs should be taken on each fraction of test

| | |
|---|---|
| Flakiness Index(%): | 10.24 |
| Elongation Index(%): | 10.53 |
| Combined FI+EL (%) | 20.76 |

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Consultant's Representative

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| TEST REPORT | |
|---|---|
| Clients | Bruhat Bangalore Mahanagara Palike |
| Project | Package No.02 (Package consists of 14 works) |
| Consultants | Tejus Consultants, Bangalore |
| Contractor | Benaka Developers & Project Pvt.Ltd. |

**SIEVE ANALYSIS**

| | | | | | |
|---|---|---|---|---|---|
| Total Weight: | 3000 gms | | | | |
| Type of Material | M sand | | Proposed Use | PCC | |
| Sample Location | Kempapura Main Road | | Date of Sampling | 17-08-2021 | |
| | | | Date of Testing | 17-08-2021 | |
| IS Sieve Size | Weight Retained | Cum. Weight Retained | Cum. % Retained | Cum. % Passing | Spec. Limit (%) Passing (Zone-II) |
| 10.00 mm | 0 | 0 | 0 | 100.00 | 100 |
| 4.75 mm | 218 | 218 | 7.27 | 92.73 | 90 - 100 |
| 2.36 mm | 319 | 537 | 17.90 | 82.10 | 75 - 100 |
| 1.18 mm | 433 | 970 | 32.33 | 67.67 | 55 - 90 |
| 0.600 mm | 466 | 1436 | 47.87 | 52.13 | 35 -59 |
| 0.300 mm | 740 | 2176 | 72.53 | 27.47 | 8-30 |
| 0.150 mm | 651 | 2827 | 94.23 | 5.77 | 0 - 10 |
| Pan | 173 | 3000 | | | - |
| | | | | | |

Remarks : ✓ Satisfactory / Not Satisfactory

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| Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28) | | |
|---|---|---|
| **Project** | Package No.02 (Package consists of 14 works) | |
| **Client** | BRUHAT BANGALORE MAHANAGARA PALIKE | |
| **Consultant** | M/s Tejus Consultants | |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. | |
| **Date of Testing** | 30-12-2021 | |
| **Layer no. or level** | WMM I layer | |
| **Depth of hole** | 250mm | |
| **Field density:** | 1 | 2 |
| **Chainage** | **Kempapura Mn Rd @58** | **Kempapura Mn Rd @114** |
| Wt. of wet material from hole (Ww) gms. | 6175 | 6192 |
| Wt. of sand+cylinder before pouring (w1) gms. | 14000 | 14000 |
| Wt. of sand+cylinder after pouring (w2) gms. | 9755 | 9702 |
| Wt. of sand in cone (w3) gms. | 826 | 841 |
| Wt. of sand in hole (w4)=(w1-w2-w3) gms. | 3419 | 3457 |
| Bulk density of sand (γs)gm/cc | 1.31 | 1.32 |
| Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc | 2.37 | 2.36 |
| Moisture meter reading(moisture content) | 12.45 | 12.56 |
| **Result** | | |
| FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc | 2.10 | 2.10 |
| MDD | 2.13 | 2.13 |
| OMC | 12.60% | 12.60% |
| % of Compaction Obtained | 98.78 | 98.61 |
| Compaction Required | 98% | 98% |

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## FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

| | |
|---|---|
| Project | Package No.02 (Package consists of 14 works) |
| Client | Bruhat Bengaluru Mahanagara Palike |
| Consultant | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | Benaka Developers & Project Pvt.Ltd. |

| | | | |
|---|---|---|---|
| Type of Material | WMM | Proposed Use | WMM |
| Sample Location | Sindhi College Gate | Date of Sampling | 05-01-2022 |
| | | Date of Testing | 06-01-2022 |

| Size of aggregate | | Flakiness Index | | Elongation Index | |
|---|---|---|---|---|---|
| Passing through IS sieve, mm | Retained on IS sieve, mm | Total wt. of aggregate retained on sieves (A) gms. | Wt. of aggregate passing from Flakiness gauge (B) gms | Wt. of aggregate retained on Flakiness gauge (C) gms | Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms |
| 63.0 | 50.0 | 0 | 0 | 0 | 0 |
| 50.0 | 40.0 | 0 | 0 | 0 | 0 |
| 40.0 | 31.5 | 0 | 0 | 0 | 0 |
| 31.5 | 25.0 | 0 | 0 | 0 | 0 |
| 25.0 | 20.0 | 0 | 0 | 0 | 0 |
| 20.0 | 16.0 | 655 | 78 | 520 | 80 |
| 16.0 | 12.5 | 1164 | 118 | 1004 | 115 |
| 12.5 | 10.0 | 748 | 66 | 722 | 56 |
| 10.0 | 6.3 | 622 | 58 | 560 | 43 |
| Total | | 3189 | 320 | 2806 | 294 |

**Note:** Minimum 200 Pcs should be taken on each fraction of test

| | |
|---|---|
| Flakiness Index(%): | 10.03 |
| Elongation Index(%): | 10.48 |
| Combined FI+EL (%) | 20.51 |

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4. The material used in the site satisfied the standard of MORTH's 5th revision and hence can be used in the work.

Consultant's Representative

# AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

| | | | |
|---|---|---|---|
| **Project** | Package No.02 (Package consists of 14 works) | | |
| **Client** | Bruhat Bengaluru Mahanagara Palike | | |
| **Consultant** | TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore | | |
| **Contractor** | M/s. Benaka Developers & Project Pvt.Ltd. | | |
| **Proposed Use** | WMM | **Date of Sampling** | 05-01-2022 |
| **Sample Locati** | Sindhi College Gate | **Date of Testing** | 06-01-2022 |

| Sl. No. | Description | | Test No. 1 | Test No. 2 | Test No. 3 | Spec Limit (%) |
|---|---|---|---|---|---|---|
| 1 | Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm) | (Wa) | 349.00 | 373.00 | 361.00 | |
| 2 | Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm) | (Wb) | 266.00 | 285.00 | 275.00 | |
| 3 | Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm) | (Wc) | 83.00 | 88.00 | 86.00 | |
| 4 | Aggregate Impact Value (%) | (Wc/Wa)*100 | 23.78 | 23.59 | 23.82 | |
| 5 | Average Aggregate impact value | (%) | 23.73 | | | Max - 30 % |

**Remarks :** ✓ Satisfactory / Not Satisfactory

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Authorised Signatory

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## GRADATION FOR WMM
## (As per MORT&H 400-11)

| | | |
|---|---|---|
| Name of Work | : | Package No.02 (Package consists of 14 works) |
| Client | : | Bruhat Bengaluru Mahanagara Palike |
| Consultant | : | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | : | Benaka Developers & Project Pvt.Ltd. |
| Date of Testing | : | 06-01-2022 |
| Type of Mix | : | WMM |
| Sample I/D | : | WMM 2 |

| | | | |
|---|---|---|---|
| Sample Location: | Sindhi College Gate | Date of Sampling: | 05-01-2022 |
| | | Date of testing: | 06-01-2022 |
| Type of material & Purpose: | WMM | Oven Dry Wt.(gms): | 10000.0 |

| IS Sieve size in mm | Weight retained | Cummulative weight retained (gm) | Cummulative % of retained | Cummulative % of passing | Specification limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0.00 | 100.00 | 100.00 |
| 45 | 356 | 356 | 3.56 | 96.44 | 95-100 |
| 22.4 | 2368 | 2724 | 27.24 | 72.76 | 60-80 |
| 11.2 | 2586 | 5310 | 53.10 | 46.90 | 40-60 |
| 4.75 | 1464.0 | 6774 | 67.74 | 32.26 | 25-40 |
| 2.36 | 885.0 | 7659 | 76.59 | 23.41 | 15-30 |
| 0.6 | 820.0 | 8479 | 84.79 | 15.21 | 8.0-22.0 |
| 0.075 | 939.0 | 9418 | 94.18 | 5.82 | 0-8 |
| Pan | 582.0 | 10000.0 | | | |
| Total | 10000.0 | | | | |

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Consultant's Representative

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| Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28) | | |
|---|---|---|
| **Project** | Package No.02 (Package consists of 14 works) | |
| **Client** | BRUHAT BANGALORE MAHANAGARA PALIKE | |
| **Consultant** | M/s Tejus Consultants | |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. | |
| **Date of Testing** | 08-01-2022 | |
| **Layer no. or level** | WMM I layer | |
| **Depth of hole** | 250mm | |
| **Field density:** | 1 | 2 |
| **Chainage** | **Sindhi College Gate '@105** | **Sindhi College Gate '@210** |
| Wt. of wet material from hole (Ww) gms. | 6122 | 6135 |
| Wt. of sand+cylinder before pouring (w1) gms. | 14000 | 14000 |
| Wt. of sand+cylinder after pouring (w2) gms. | 9778 | 9739 |
| Wt. of sand in cone (w3) gms. | 826 | 841 |
| Wt. of sand in hole (w4)=(w1-w2-w3) gms. | 3396 | 3420 |
| Bulk density of sand (γs)gm/cc | 1.31 | 1.32 |
| Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc | 2.36 | 2.37 |
| Moisture meter reading(moisture content) | 12.45 | 12.56 |
| **Result** | | |
| FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc | 2.10 | 2.10 |
| MDD | 2.13 | 2.13 |
| OMC | 12.60% | 12.60% |
| % of Compaction Obtained | 98.60 | 98.76 |
| Compaction Required | 98% | 98% |

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| Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28) | | |
|---|---|---|
| **Project** | Package No.02 (Package consists of 14 works) | |
| **Client** | BRUHAT BANGALORE MAHANAGARA PALIKE | |
| **Consultant** | M/s Tejus Consultants | |
| **Contractor** | Benaka Developers & Project Pvt.Ltd. | |
| **Date of Testing** | 08-01-2022 | |
| **Layer no. or level** | WMM I layer | |
| **Depth of hole** | 250mm | |
| **Field density:** | 1 | 2 |
| **Chainage** | **Heera Cateres Rd ( Mariyappanapalya ) @31** | **Heera Cateres Rd ( Mariyappanapalya ) @66** |
| Wt. of wet material from hole (Ww) gms. | 6148 | 6177 |
| Wt. of sand+cylinder before pouring (w1) gms. | 14000 | 14000 |
| Wt. of sand+cylinder after pouring (w2) gms. | 9760 | 9712 |
| Wt. of sand in cone (w3) gms. | 826 | 832 |
| Wt. of sand in hole (w4)=(w1-w2-w3) gms. | 3414 | 3456 |
| Bulk density of sand (γs)gm/cc | 1.31 | 1.32 |
| Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc | 2.36 | 2.36 |
| Moisture meter reading(moisture content) | 12.45 | 12.56 |
| **Result** | | |
| FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc | 2.10 | 2.10 |
| MDD | 2.13 | 2.13 |
| OMC | 12.60% | 12.60% |
| % of Compaction Obtained | 98.49 | 98.40 |
| Compaction Required | 98% | 98% |

**Note:**

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# PRECAST SLAB (CORE) TEST REPORT

| | | |
|---|---|---|
| **Client** | : | Bruhat Bangalore Mahanagara Palike |
| **Contractor** | : | Benaka Developers & Project Pvt.Ltd. |
| **Name of Work** | : | Package No.02 (Package consists of 14 works) |
| **No.of Sample Tested** | : | 3 |
| **Date of Testing** | : | 20-01-2022 |
| **Techinical Reference** | : | IS:516-1959 (Reaffirmed 1999), SP-24:1983. |
| **Grade of Concrete** | : | M20 100mm thick |

| Sl. No. | Dia of Core D (mm) | Height of Core H (mm) | Core Wt (Kg) | Density of Core (kg / $m^3$) | H / D | Correction factor (Based on H/D) | Failure Load (kN) | Core Strength ( $N/mm^2$) | Correction Factor for the Dia. (Strength of the Core x 1.08) | Corrected Cylinder Compressive Strength ($N/mm^2$) | Equivalent Cube Compressive Strength ($N/mm^2$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.00 | 90.00 | 0.469 | 2654.00 | 1.80 | 0.960 | 39.55 | 20.14 | 21.75 | 20.88 | 26.10 |
| 2 | 50.00 | 90.00 | 0.471 | 2665.31 | 1.80 | 0.960 | 39.67 | 20.20 | 21.82 | 20.95 | 26.18 |
| 3 | 50.00 | 90.00 | 0.458 | 2591.75 | 1.80 | 0.960 | 39.72 | 20.23 | 21.85 | 20.97 | 26.22 |

**Note:**

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4. The material used in the site satisfied the standard of MORTH's 5th revision and hence can be used in the work.

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Consultant's Representative